Docket No. SA-532

Exhibit No. 16 A

National Transportation Safety Board

Washington, DC

Wildlife Factors Group Chairman
Factual Report
(15 pages)

NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF AVIATION SAFETY
WASHINGTON, D.C.

May 15, 2009

Wildlife Factors Group Chairman's Factual Report of Investigation

DCA09MA026

NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF AVIATION SAFETY
WASHINGTON, D.C.

May 15, 2009

Wildlife Factors Group Chairman's Factual Report of Investigation

A.	Accident	:	DCA09MA026
	LOCATION	:	New York, NY
	DATE	:	January 15, 2009
	TIME	:	~ 1530 Eastern Standard Time
	AIRCRAFT	:	Airbus Industrie A320-214, N106US
	OPERATOR	:	US Airways, flight 1549

B. Airports Group

Chairman	:	Mark H. George National Transportation Safety Board Washington, D.C.
Member	:	Michael J. Begier United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services Washington, D.C.
Member	:	Allen Gosser United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services Castleton, NY
Member	:	Evelyn Martinez FAA Airports Division Jamaica, NY
Member	:	Doug Stearns Port Authority of New York & New Jersey LaGuardia Airport Flushing, NY

C. Summary

On January 15, 2009, about 1530 Eastern Standard Time, U.S Airways flight 1549, an Airbus Industrie A320-214, registration N106US, lost thrust in both engines and made an emergency landing in the Hudson River, following take off from New York's LaGuardia Airport (LGA). The scheduled, domestic passenger flight, operated under the provisions of Title 14 CFR Part 121, was en route to Charlotte Douglas International Airport (CLT) in Charlotte, North Carolina. The 150 passengers and 5 crewmembers evacuated the aircraft and were rescued by local ferry operators and boaters in the immediate area.

D. Details of the Investigation

According to the airplane's flight data recorder and primary radar data, the initiating event occurred at a distance of 4.3 miles from LaGuardia Airport at an altitude of 2,818 feet above ground level (AGL).

1.0 Airport

LaGuardia Airport (Figure 1) is located on approximately 680 acres in Flushing, NY, on the East River, adjacent to both Flushing Bay and Bowery Bay. It is at sea level. Near the airport property are urban, residential, and commercial areas, and major roads and parkways. LGA is .5 miles from the College Point Marine Waste Transfer Facility, 1.1 miles from College Point Shore Front Park, 1.2 miles from Citi Field (Mets Stadium), and 3 miles from Manhattan. Rikers Island [1] is approximately 600 feet from the departure end of Runway 4 (Figure 2).

LGA has two runways: Runway 04/22 (7,001 ft. x 150 ft.) and runway 13/31 (7,003 ft. x 150 ft.). Both are grooved, asphalt/concrete composition, with high-intensity runway edge lights, and centerline lights. The departure ends of runways 13 and 22 incorporate engineered materials arresting system (EMAS) overrun protection areas.

The current Airport Master Record 5010 for LGA indicated a total of 397,280 operations were conducted in calendar year 2007, which included commercial, general, and military aviation. The Master Record also contained the following remark: "Flocks of birds on & invof (in the vicinity of) arpt (airport)."

LGA is certificated under 14 CFR Part 139, and is inspected by the FAA for regulatory compliance annually. As a requirement of certification, LGA maintains an Airport Certification Manual (ACM), containing chapters that document various airport operations. One chapter, the Wildlife Hazard Management Plan (WHMP), addresses the airport's efforts to minimize wildlife hazards on the airport. The LGA WHMP was developed by United States Department of Agriculture (USDA) Animal and Plant Health

[1] NYC Department of Corrections Detention Facility

Inspection Service (APHIS), Wildlife Services (WS) in 2002, and was based on a USDA Wildlife Hazard Assessment (WHA) conducted during 2000. The current LaGuardia WHMP was approved by the FAA on 9/22/2008. Airport certification inspections conducted from April 2003 through April 2008 contained no discrepancies with regard to the airport's WHMP.

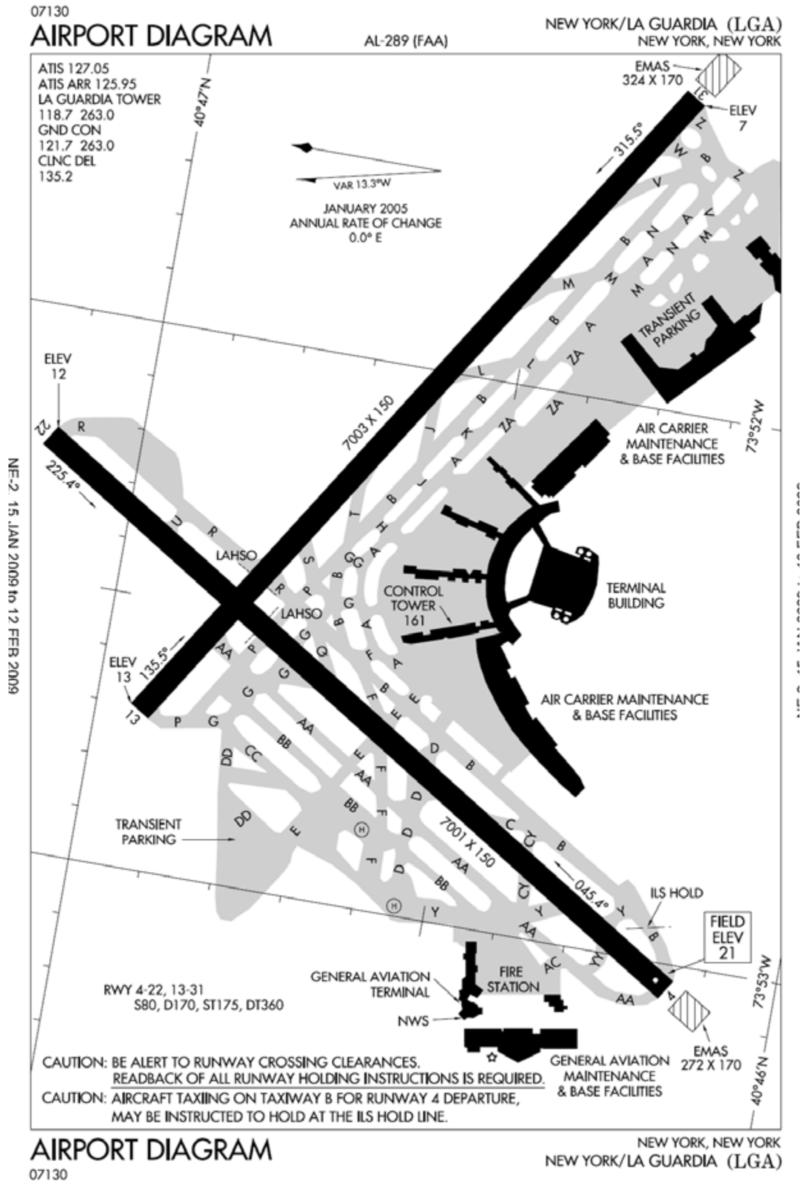

Figure 1. LaGuardia Airport Diagram

1.1 LGA Wildlife Hazard Management Plan

As stated above, the LGA WHMP was based on a WHA conducted by the USDA Wildlife Services in 2000. The WHA fulfilled the requirements of subsections (a) and (b) of 14 CFR 139.337. The objectives of the WHA was to: 1) identify the species, numbers, locations, local movement, and daily and seasonal occurrences of wildlife observed; 2) identify and locate features on and near the airport that attract wildlife; 3) describe existing wildlife hazards to air carrier operations; 4) review available wildlife strike records; and, 5) provide recommendations for reducing wildlife hazards at LGA. The resulting LGA WHMP fulfilled the requirements of subsection (f) of 14 CFR 139.337.

In accordance with the WHA, LGA's WHMP emphasizes the use of techniques to exclude, disperse, or remove hazardous wildlife from the airfield. These techniques include: active non-lethal and lethal means of removing birds, monthly wildlife surveys conducted by USDA Wildlife Services, development of an in-house enhanced gull removal program, and nest/egg mitigation. The WHMP notes that herring gulls, double-crested cormorants, and Canada geese pose serious strike threats to airplanes, due to their large size, and special emphasis is placed on removal of these species. In addition, USDA Wildlife Services assists with LGA wildlife mitigation activities, and also conducts an annual review of the airport's WHMP.

Wildlife management personnel at LGA inspect the airfield for wildlife activity throughout each day, and monitor the tidal flat areas, especially the area adjacent to runway 31, looking for loafing and feeding birds. Any birds found on the airfield or using the flats are dispersed or removed, or when necessary, are destroyed. Wildlife management personnel assist the Port Authority Police Department in the capture and removal of stray mammals on the Airport Operations Area (AOA).

LGA employs a full-time[2] "bird supervisor" to perform wildlife control activities, maintain wildlife hazard management logs, recover and identify carcasses for wildlife strike reporting, and to gather and report other wildlife strike information. In addition, annual training of bird supervisors is conducted by qualified airport wildlife biologists. This training includes: wildlife identification, applicable laws, and wildlife management techniques.

LGA, USDA, the City of New York, and other local, state and federal agencies are members of the NYC Wildlife Hazard Management Task Force, a group that was established to monitor and coordinate wildlife control activities at the airport, and throughout NYC. Among other activities, the task force works with landowners near the airport to minimize habitats and activities attractive to hazardous wildlife.

Additional strategies used at LGA for wildlife mitigation are:

<u>Rikers Island Goose Population Management</u>

LGA and the USDA work together, along with the NYC Mayor's Office, NYC Department of Correction (which operates Rikers Island), the Town of Hempstead (Long Island, NY), NYC Department of Parks, NYC Department of Environmental Protection, NYC Economic Development Corporation, NY State Department of Environmental

[2] A bird supervisor is on duty at LGA 24 hours a day, 365 days per year.

Conservation, US Fish & Wildlife Service, and the National Park Service to reduce the number of Canada Geese at Rikers Island. From June 2004 through June 2008, 1,249 captured geese have been removed from the area. In addition, any goose nests and eggs discovered are routinely destroyed.

Grass

Grass cover is an attractant to Canada geese, both as a food source and as a loafing area. LGA has sponsored studies to examine different varieties of grass, in an attempt to identify varieties that are aversive to waterfowl. Since the implementation of this program, and subsequent planting of less desirable plants and use of artificial turf, LGA has had a decrease in the number of geese attracted to grassy areas.

Water

Standing water is an attractant for wildlife. LGA monitors the airport for standing water, and drains or removes the attractant as quickly as is feasible.

Perch Sites

A variety of natural and man-made structures are found on LGA that are attractive to birds for perching. When perching activities are observed, the structures are modified to include bird deterrent devices, or in other ways to make them undesirable.

Food and Refuse

Food and waste areas are strong attractants to wildlife. Signs are posted around the airport terminals, hangars, construction areas, and the taxi hold areas to remind employees and drivers that feeding of wildlife is absolutely prohibited, and that failure to follow the rules may result in fines or other forms of punishment. Covered waste receptacles are provided in these areas, the sites are kept clean, and employees are reminded to ensure that covers remain in place.

Hangars and Buildings

Hangars and buildings at the airport are monitored for bird presence. If birds are observed, tenants are notified that they are responsible for removing and excluding the birds.

1.2 FAA Guidance to Certificated Airports

According to 14 CFR Part 139.337, certificated airports are required to conduct a wildlife hazard assessment when any of the following events occur on or near the airport: 1) an air carrier aircraft experiences multiple wildlife strikes; 2) an air carrier aircraft experiences substantial damage from striking wildlife; 3) an air carrier aircraft experiences an engine ingestion of wildlife; or (4) wildlife of a size, or in numbers, capable of causing an event described above (1, 2, or 3) is observed to have access to any airport flight pattern or aircraft movement area. The regulation also requires that if the wildlife hazard assessment indicates that a wildlife hazard management plan is needed, the certificate holder, in consultation with the FAA Administrator, may decide that a wildlife hazard management plan is required and should be implemented. If this determination has been reached, the airport creates and implements a wildlife hazard management plan into their airport certification manual (ACM). The FAA provides guidance material in the form of Advisory Circulars (ACs), CertAlerts, and other documents (see section 2.3) for airports to use in constructing, implementing, and evaluating a wildlife hazard management plan.

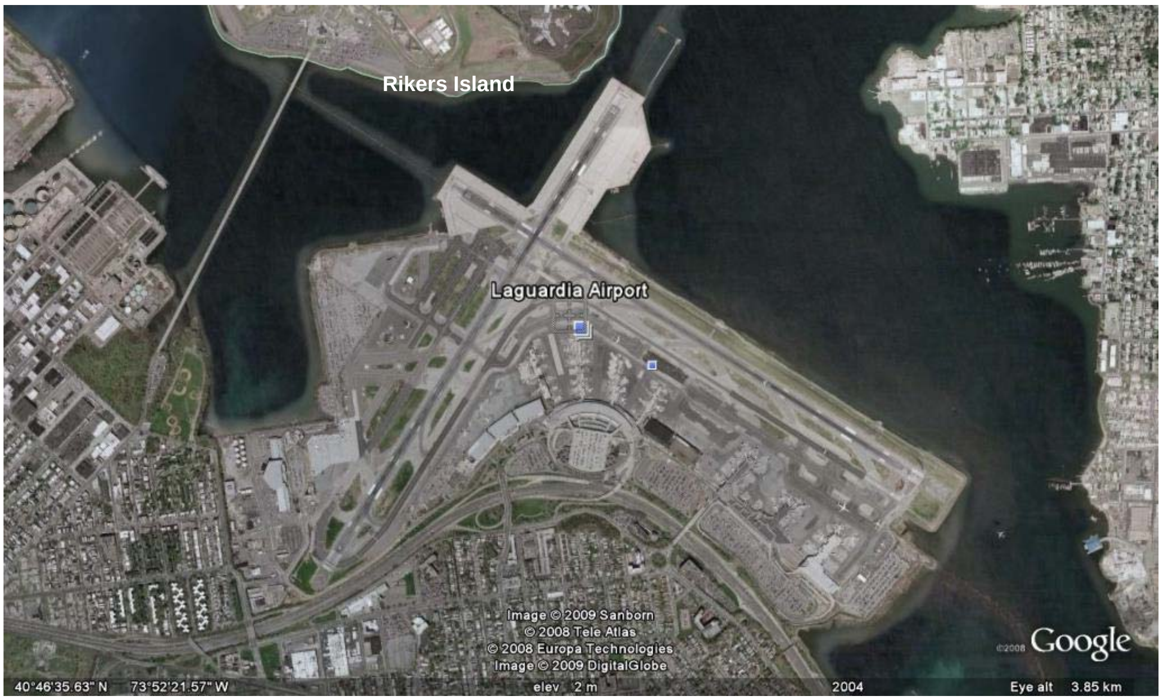

Figure 2. Aerial Photograph of LaGuardia Airport

For certificated airports such as LGA, the FAA recommends that airport operators implement the standards and practices contained in Advisory Circular (AC) 150/5200-33B, *Hazardous Wildlife Attractants on or near Airports*. Section 1-4 of the AC, entitled, *Protection of Approach, Departure, and Circling Airspace*, recommends for all airports, a distance of 5 statute miles be established between the farthest edge of the Airport Operations Area (AOA) and any hazardous wildlife attractant, if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace.

1.3 Airport Response

According to ATC transmissions, after flight 1549 departed LGA, the pilot radioed ATC, reported a "bird strike," and indicated he was returning to the airport. ATC used the crash phone in the tower to alert aircraft rescue and firefighting (ARFF) crews of the returning airplane. A full ARFF response was initiated and fire trucks positioned along the runway. In addition, a rescue boat was dispatched from LGA to the accident site.[3] At 1537, Runway 04/22 and the adjacent safety areas were inspected by airport personnel and no FOD or wildlife remains were found.

2.0 FAA and USDA Wildlife Mitigation Efforts

2.1 FAA National Wildlife Strike Database

Since 1990, the FAA has collected voluntary wildlife strike reports and maintained a wildlife strike database. The database is managed by Wildlife Services Program of the USDA APHIS under terms of an interagency agreement with FAA. Strike reports are sent to USDA Wildlife Services where they undergo a quality assurance process and are entered into the FAA strike database. Currently, the database contains 89,734 records of wildlife strikes to civil aviation (January 1990 - December 2008).

The database can be used to identify species that are involved in strikes, seasonal patterns, and the extent and type of damage resulting from strikes. For the period of January 1, 2004 through December 31, 2008 the database strike information for LaGuardia Airport showed a total of 411 wildlife strikes, which involved all phases of flight.

In 2005, USDA scientists completed a research project to determine what percentage of actual strikes was reported in the FAA database. The researchers obtained 14 independent sets of wildlife strike data from three airlines and three airports, for various years 1991 – 2004. By comparing the data from the airports and airlines with the data entered into the FAA wildlife strike database, it was determined that 21% of known strikes were actually captured in the database. These data indicate that the voluntary reporting system underestimates actual wildlife strikes, possibly missing as much as 80% of available data.[4]

2.2 Species Identification

The FAA maintains a contract with the Smithsonian Institute Feather Identification Laboratory for analysis and identification of bird remains found on airports. The results of the analysis are returned to the airport, the FAA, and the USDA Wildlife Services Program for addition to the National Wildlife Strike Database.

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[3] 14 CFR Part 139 requires that certificated airports include in their emergency plans a water rescue plan if significant bodies of water and marsh lands are situated beneath the approach and departure paths within at least two miles of the end of the runway.

[4] Wright, S. E. and R. A. Dolbeer. 2005. Percentage of wildlife strikes reported and species identified under a voluntary system. *In* Proceedings of Bird Strike Committee USA/Canada meeting, Vancouver, B.C. Canada (www.birdstrikecanada.com). The study is also documented in Cleary, E. C., R. A. Dolbeer, and S. E. Wright. 2005. Wildlife strikes to civil aircraft in the United States, 1990-2004. U.S. Department of Transportation, Federal Aviation Administration, Office of Airport Safety and Standards, Serial Report No. 11, Washington, DC. 53 pages.

2.3 Wildlife Hazards Manual

Certificated airports have a responsibility under 14 CFR Part 139 to ensure the airport maintains a safe operating environment, including mitigation of wildlife hazards. To assist airports in managing these risks, the FAA and USDA collaborated to produce a manual entitled, *Wildlife Hazard Management at Airports*. The manual contains information to assist airport personnel in understanding and mitigating wildlife hazards to aviation , conducting WHAs, and in the development, implementation, and evaluation of WHMPs. The manual also includes specific information on the nature of wildlife strikes, legal authority, government agency roles and responsibilities, and pertinent regulations. The manual is available on the Internet at:
http://wildlife.pr.erau.edu/EnglishManual/2005_FAA_Manual_complete.pdf

2.4 Wildlife Hazard Mitigation Research Programs

The FAA wildlife research program is conducted by the FAA Technical Center at Atlantic City, the USDA Wildlife Services National Wildlife Research Center Field Station in Sandusky, Ohio, and the University of Illinois Center of Excellence in Airport Technology. Some of the areas of research include: habitat modification, such as lengths and types of grass that attract or dispel birds, and harassment techniques such as air cannons, lasers, effigies, pulsed landing lights, falconry, and dogs. Other research studied airport vegetation, artificial turf, earthworm, rodent, and landfill control, and use of radar for bird detection.

2.5 Avian Radar

A research project sponsored by the FAA and U.S. Navy Space and Naval Warfare Systems Center was initiated in 2000 to determine if low-cost, small mobile radars can reliably detect birds at or near airports, and if the results can be used to develop a local airport bird strike advisory system. Small, mobile radar evaluations are currently underway at Seattle-Tacoma International Airport, Naval Air Stations Whidbey Island and Patuxent River, Marine Corps Air Station Cherry Point, and Vancouver International Airport, Canada. Future research installations are planned for Chicago O'Hare International Airport, Dallas Fort Worth International Airport, and John F. Kennedy International Airport.

According to the FAA website,[5] from preliminary results of experimental avian radar systems, it is "not yet known if this system would be capable of providing alerts that would be operationally suitable for making specific decisions on landing or takeoff," and that "research is continuing to address these operational type issues." However, the FAA website indicates that radar data has shown to be useful in tracking and quantifying wildlife movements on and around airfields, as an enhancement to existing wildlife control programs.

[5] http://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=10376

2.6 Pulse Lights

Reports that landing lights can be manipulated to repulse birds from the path of an airplane have existed in anecdotal form for many years; however, few systematic experiments have been conducted to assess the usefulness of such procedures. One such experiment, conducted by USDA,[6] tested the hypothesis that during daylight, captive birds exposed to an approaching ground-based vehicle exhibiting pulsing 250-watt white aircraft landing lights would initiate avoidance behavior more quickly than birds experiencing an oncoming vehicle with non-pulsing (steady) or no lights (control). The experiment used captive brown-headed cowbirds (*Molothrus ater*), Canada geese (*Branta canadensis*), European starlings (*Sturnis vulgaris*), herring gulls (*Larus argentatus*), and mourning doves(*Zenaida macroura*) as subjects. The results showed 250-watt white landing lights, pulsed at 45 cycles/minute, influenced behavior of captive cow birds in response to an oncoming ground-based vehicle, however, the avoidance response was inconsistent across experiments, and little or no avoidance behavior was observed in other species. The researchers suggested that further research was needed to investigate avian response to specific light wavelengths and pulse frequencies.

Another evaluation of pulsed landing lights was conducted by QANTAS Airlines in cooperation with a vendor of pulsed lighting systems. QANTAS outfitted five B737-400s and five B737-800s with the pulsed lighting systems, and then resumed normal operations for one year. The strike rates were then normalized and compared to strike data for comparable aircraft in the fleet that did not have pulsed lights installed. The results indicated that the average strike reduction rate between approximately 10% and 30% per 1,000 departures for B737-400 aircraft equipped with pulsed lights, and an average strike reduction rate between approximately 10% and 40% per 1,000 departures for B737-800 aircraft equipped with pulsed lights.[7]

3.0 Biological Material Sampling and Analysis

On January 19, 2009, the Wildlife Factors Group examined various pieces of flotsam from flight 1549 stored in an FBI garage in New York City. Seven samples of unknown material were collected from wreckage from this site. Later that day, the group examined the fuselage and # 2 engine of flight 1549 on a barge in New Jersey. Samples of suspected biological material were collected from the right engine fan, the radome, the # 3 flap track on the left wing, and various locations on the fuselage. A total of ten samples were taken. On January 20, 2009, the shroud (“canoe”) from the # 3 flap track on the left wing was removed, and two additional samples were retrieved.

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[6] Bradley F. Blackwell and Glen E. Bernhardt, *Efficacy of Aircraft Landing Lights in Stimulating Avoidance Behavior in Birds;* Journal of Wildlife Management; Vol. 68, Issue 3; pp 725 – 732; July 2004.

[7] Pulselite System B737 Operational Evaluation, Evaluation Period Jan 2005- August 2007, QANTAS, Unpublished.

On January 29, 2009, a USDA representative and General Electric (GE) personnel collected six samples from the exterior of the #1 engine, prior to engine teardown at the GE aircraft Engine Facility, Cincinnati, OH.

On February 3 – 5, 2009, the USDA representative and the NTSB Powerplants Group, collected 23 samples of biological material (feathers, blood, muscle, and bone) from engine # 1, and 14 samples from engine # 2 .

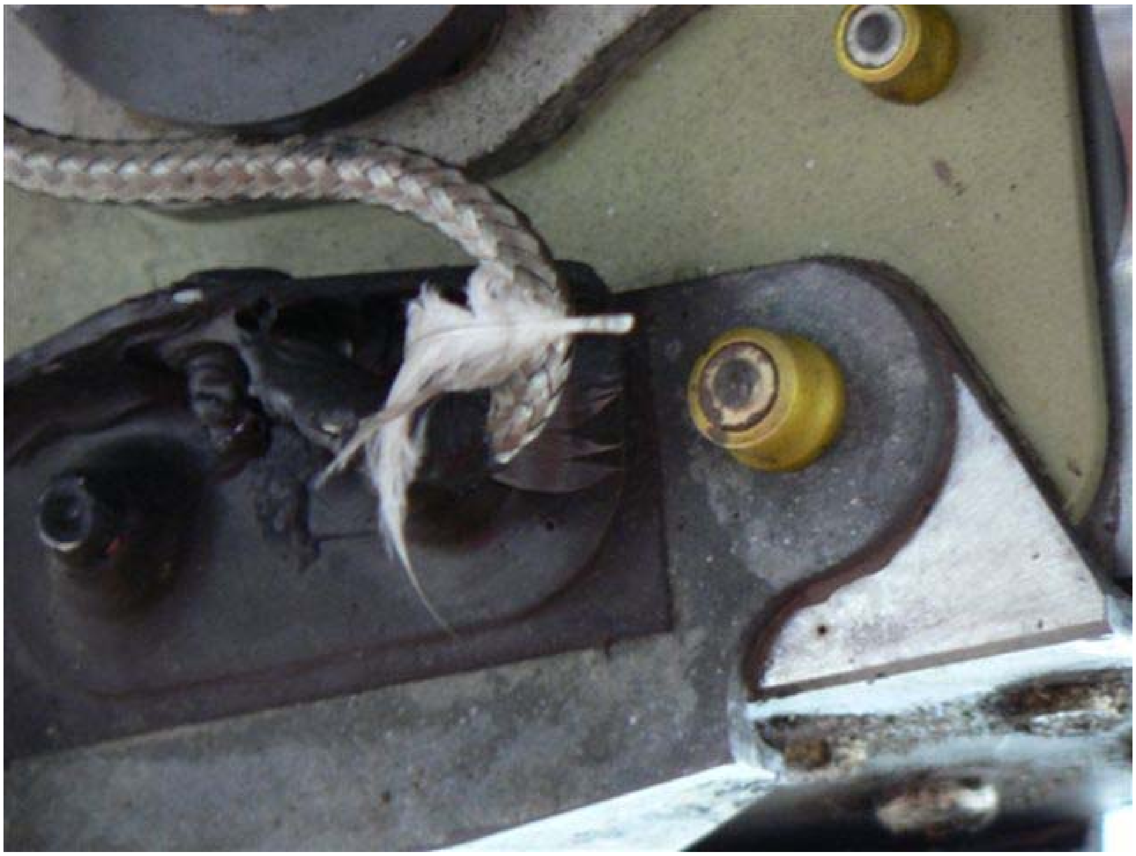
All samples were submitted to the Smithsonian Institution's Feather Identification Laboratory for species identification. On February 16, 2009, the Feather Lab provided the results of the analyses. Of the 68 total samples received for identification, 39 were submitted for DNA testing. Of those, 18 (14 from engines) contained viable DNA and

Photograph 1. Investigators removing samples of biological material from engine # 2 fan.

matched 99% or better to the Barcode of Life Database[8] for Canada goose (*Branta canadensis*). A total of 52 (49 from engines) of the samples contained feathers or feather fragments that were consistent with Canada goose. Three of the samples from the fuselage contained microscopic feather fragments consistent with pigeon/dove, duck, and songbird (Passerines) (Attachment 1).

[8] The Barcode of Life Database (BOLD) is an international collaborative effort to generate a unique genetic barcode for every species of life on earth

DNA sexing was successful on 16 of the 18 samples from the engines and wing of the aircraft. Both male and female Canada goose remains were found in engine #1; only male remains were found in engine #2; and only female remains were found on the left wing # 3 flap track.



Photograph 2: Feather remains found in the # 3 flap track assembly.

The Smithsonian Institution also performed a stable-hydrogen isotope analysis[9] of the feather material collected from the airplane engines, and then compared the results with feather samples collected from resident geese in the New York region. The results indicated that the feathers from the airplane engines were similar to samples of known migrant geese, and were significantly different from year-round resident populations from the New York region.[10] Based on the findings, the likely subspecies of the geese remains were *Branta canadensis canadensis* or *Branta canadensis interior* (Figure 3).

[9] Caccamise, Donald, F; L.M. Reed; P.M. Castelli; S. Wainright; T.C. Nichols, *Distinguishing Migratory and Resident Canada Geese Using Stable Isotope Analysis*; Journal of Wildlife Management, Vol. 64, No. 4, October 2000, pp. 1084-1091.

[10] Marra, P. P., C. J. Dove, R. Dolbeer, N. F. Dahlan, M. Heacker, J. F. Whatton, N. E. Diggs, C. France, and G. A. Henkes. 2009 (*in press*). *Migratory Canada Geese cause crash of US Airways Flight 1549*, Frontiers in Ecology and the Environment.

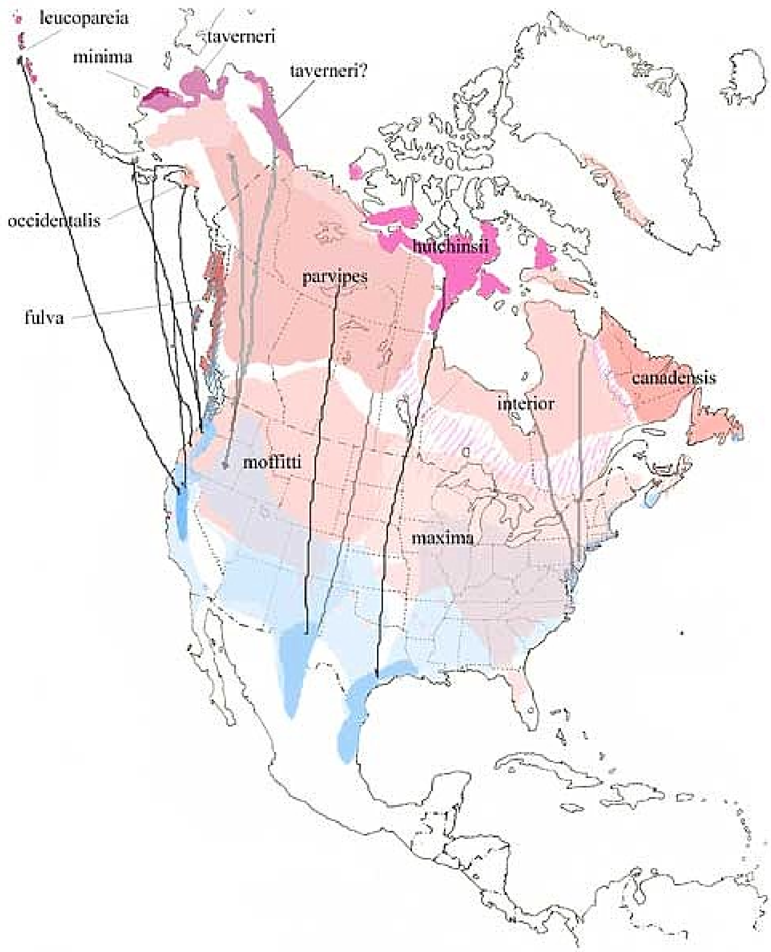


Figure 3. Map of migratory routes for various subspecies of Canada geese

4.0 Wildlife Management Considerations

Aircraft collisions with birds and other wildlife cost the civil aviation industry in the United States about $625 million per year.[11] Approximately 98 percent of wildlife strikes involve birds (*ibid*). At least 229 people have died and 194 aircraft have been destroyed as a result of bird strikes and other wildlife strikes with civil and military aircraft from 1988 - April 2009.[12]

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[11] Dolbeer, R.A. and S. E. Wright. 2008. *Wildlife strikes to civil aircraft in the United States, 1990-2007*. U.S. Department of Transportation, Federal Aviation Administration, Serial Report No. 14. Washington, DC, USA. 57 pages.

[12] Richardson, W. J., and T. West. 2000. *Serious birdstrike accidents to military aircraft: updated list and summary*. Pages 67-98 in Proceedings of 25th International Bird Strike Committee meeting. Amsterdam, The Netherlands; Thorpe, J. 2003. *Fatalities and destroyed aircraft due to bird strikes, 1912-2002*. Pages 85-113 in Proceedings of the 26th International Bird Strike Committee meeting (Volume 1). Warsaw, Poland. Dolbeer, RA, unpublished data.

The number of strikes annually reported in the US increased from 1,759 in 1990 to 7,666 in 2007.[13] There are a number of reasons for the increase. Airports, with large areas of grass and pavement, are attractive habitats to birds for feeding and resting. Other wildlife such as deer and coyotes are also attracted to airport environments for similar reasons. Modern turbofan-powered aircraft have quieter engines, and are less obvious to birds, compared to noisier piston-powered aircraft and older turbine-powered aircraft. Additionally, commercial aircraft movements in the USA have increased at about 2% per year since 1980. The majority of wildlife strikes (93%) occur below 3,500 feet above ground level (AGL). Since 1960, 26 large-transport aircraft have been destroyed because of bird strikes worldwide, 24 (92%) of these strikes occurred during take-off or landing at less than 500 feet AGL.[14]

Various government-sponsored programs initiated over the past 40 years, such as pesticide regulation, expansion of wildlife refuge systems, wetlands restoration, and land-use changes, have resulted in increases in populations of many wildlife species in North America.[15] Of the approximately 650 bird species that nest in North America, 36 have average body masses greater than 4 lbs. Of the 31 species for which population trend data are available, 24 (77%) showed population increases over the past 20-40 years, while two showed declines, and five were stable. Further, 13 of the 14 species with body masses over 8 lbs, such as the Canada goose, showed population increases.

Canada goose populations in North America can be divided into two groups based on migratory behavior. One group continues to engage in annual seasonal migration, spending winter and summer months in different locations. The other group has ceased migratory behavior, therefore, establishes year-round residency in a particular location. Overall, the population of Canada geese has increased from 1.2 million in 1970 to 5.5 million in 2008. However, the largest portion of this increase has been within the population of resident geese which increased from .2 million in 1970 to 3.9 million in 2008. The migrant population has been relatively stable since 1990 with the population of about 1.6 million in 2008. In sum, resident geese comprised 19% of the total Canada geese in 1970, 39% of the total in 1990, and in 2008 accounted for 71% of the overall Canada goose population. Canada geese are particular hazardous to aviation due to their large size, flocking behavior, attraction to grazing sites at airports, and for the year-round presence of resident populations.[16]

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[13] Dolbeer, R.A. and S. E. Wright. 2008. *Wildlife strikes to civil aircraft in the United States, 1990-2007*. U.S. Department of Transportation, Federal Aviation Administration, Serial Report No. 14. Washington, DC, USA. 57 pages.

[14] Dolbeer, R. A. 2006. *Height distribution of birds recorded by collisions with aircraft*. Journal of Wildlife Management 70 (5): 1345-1350.

[15] Richard Dolbeer and Paul Eschenfelder. 2003. *Amplified Birdstrike Risks Related to Population Increases of Large Birds in North America.* Proceedings, International Bird Strike Committee 26, Volume I: 49-67.

[16] Dolbeer, Richard A, and Seubert, John L.; *Canada Goose Populations and Strikes With Civil Aircraft, 1990-2008: Challenging Trends for Aviation Industry*, US Department of Agriculture, March 2009

Photograph 3, Canada goose (typical)

Table 1. Weights of Canada geese subspecies[17]

Branta canadensis canadensis	Mean weight	Maximum weight
Male	3814 g (8.41 lbs)	6265 g (13.81 lbs)
Female	3314 g (7.31 lbs)	5902 g (13.01 lbs)

Branta canadensis interior	Mean weight	Maximum weight
Male	4181 g (9.23 lbs)	4727 g (10.42 lbs)
Female	3514 g (7.75 lbs)	3912 g (8.62 lbs)

4.1 New York City Metropolitan Area

The four airports serving the NYC metropolitan area are JFK International Airport, LaGuardia Airport, Newark Liberty International Airport, Teterboro Airport, and Stewart International Airport. Three of these airports are located within a 10 mile radius of Manhattan. Numerous wildlife attractants exist in the vicinity of these airports, including: landfills, waste transfer stations, city parks, golf courses, ponds, roosting areas such as trees and shrubs, estuaries, tidal areas that expose food sources (e.g., shellfish), deep water areas that provide prey for diving birds like cormorants, roadway medians for nesting Canada geese, water detention basins, open dumpsters, recreational fields, grassland, and beaches.

According to the FAA National Wildlife Strike Database, from January 1990 through August 2008, there have been a total of 4,253 bird strikes in the New York City area, including reports from JFK International Airport, LaGuardia Airport, Newark Liberty International Airport, and Teterboro Airport. In general, winter months (December, January, and February) have the fewest strikes in North America, whereas

[17] *CRC Handbook of Avian Body Masses*, Dunning, John B., 2007.

the spring (May) and fall migration months (August, September, October) have the most strikes.[18] These trends are consistent for the New York City area as well, where December, January, and February were the three consecutive months with the lowest number of strikes involving Canada geese, snow geese, and brant. Strike data for all wildlife species shows January as the month with the second fewest wildlife strikes, February has the fewest, and October has the most. Of the strike records that occurred in the New York City area from January 1990 through August 2008 (where altitude was reported), five percent occurred between 2,200 and 4,200 feet.[19]

5.0 Attachments

1. Smithsonian Institute Feather Lab Analysis

[18] Dolbeer, R.A. and S. E. Wright. 2008. *Wildlife strikes to civil aircraft in the United States, 1990-2007*. U.S. Department of Transportation, Federal Aviation Administration, Serial Report No. 14. Washington, DC, USA. 57 pages.

[19] FAA National Wildlife Strike Database.